

What is Claimed Is:

1. An apparatus for the manufacture of a carbonaceous article, the apparatus comprising:

a chamber having at least one heating element and at least one port for introducing a precursor to the chamber;

a catalyst disposed in the chamber capable of converting the introduced precursor to the carbonaceous article; and

a device near the catalyst that is capable of generating a magnetic field to affect the catalyst during the formation of the carbonaceous article from the precursor.

2. The apparatus according to claim 1, wherein the device comprises at least one stationary magnet disposed within the chamber.

3. The apparatus according to claim 1, wherein the catalyst comprises a nickel, cobalt or iron-based catalyst or mixtures thereof.

4. The apparatus according to claim 3, comprising a catalyst bed disposed in the chamber, wherein the catalyst bed comprises the catalyst supported on a porous substrate.

5. The apparatus according to claim 4, comprising a second chamber disposed within the chamber having the at least one heating element and the catalyst bed disposed within the second chamber.

6. The apparatus according to claim 1, wherein the device is at a distance to produce a magnetic field of about several hundred gauss to influence the catalyst.

7. The apparatus according to claim 1, comprising an inlet port on the chamber for introducing the precursor and outlet port on the chamber.

8. The apparatus according to claim 1, comprising a precursor source container in fluid communication with the chamber.

9. The apparatus according to claim 1, comprising:

at least one port on the chamber for introducing the precursor to the chamber;

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a transition metal-based catalyst as the catalysts on or in a porous substrate to define a catalyst bed that is disposed in the chamber; and

a magnet near the catalyst bed that is capable of generating a magnetic field to confine the transition metal-based catalyst to the catalyst bed during the formation of the carbonaceous article from the precursor.

10. A method of manufacturing a carbonaceous article, the method comprising:  
contacting a carbon-containing precursor with a metal catalyst to form the carbonaceous article;

applying a magnetic field near the metal catalyst during the formation of the carbonaceous article; and

separating the formed carbonaceous article from the metal catalyst.

11. The method according to claim 10, comprising applying the magnetic field at a distance to produce a magnetic field of about several hundred gauss to influence the catalyst.

12. The method according to claim 10, comprising applying a magnetic field of no less than about 100 gauss.

13. The method according to claim 10, comprising heating the metal catalyst from about 100 °C to about 1000 °C.

14. The method according to claim 10, comprising contacting the metal catalysts with a hydrocarbon as the carbon-containing precursor.

15. The method according to claim 10, comprising contacting the carbon-containing precursor with an iron, nickel or cobalt-based catalyst.

16. The method according to claim 10, comprising separating the formed carbonaceous article from the catalyst by applying a stream of gas.

17. The method according to claim 10, comprising forming a carbonaceous article having a cross-section of less than one micron.

18. The method according to claim 10, comprising:

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applying a magnetic field of at least 100 gauss near the catalyst during the formation of the carbonaceous article.

contacting a carbon-containing precursor with a catalyst bed to form a first carbonaceous article;

separating the formed first carbonaceous article from the catalyst bed; and

20. The method according to claim 19 comprising reusing the catalyst bed to form the second carbonaceous article without re-seeding the catalyst bed.